FRANTSEVICH, I.N.[Frantsevych, I.M.]; KALINOVICH, D.F. [Kalynovych, D.F.] KOVENSKIY, I.I. [Kovens'kyi, I.I.]; PEN'KOVSKIY, V.V. [Pen'kovs'kyi, V.V.]

Migration of components of solid metal solutions in a direct current field. Part 2. [in Ukrainian with summary in English]. Ukr. fiz. zhur. Supplement to 3 no.1:64-67 '58. (MIRA 11:6)

1.Institut metalokeramiki i spetssplaviv AN URSR.
(Ions--Migration and velocity)
(Solutions, Solid--Electric properties)

FRANTSEVICH, I.M. [Frantsevych, I.M.]; KALINOVICH, D.F. [Kalynovych, D.F.]; KOVENSKIY, I.I. [Kovens'kyi, I.I.]; PEN'KOVSKIY, V.V. [Pen'kovs'kyi, V.V.]

On the migration of solid metal solution components in a direct current field [In Ukrainian with summary in English]. Ukr.fiz.zhur. 3 no.1:124-133 Ja-F '58. (MIRA 11:4)

1.Institut metalokeramiki spetsial'nikh splaviv AN URSR.
(Heat resistant alloys)
(Electric fields)

KALINOVICH, D.F.

FRANTSEVICH, I.N. [Frantsevych, I.M.]; KALINOVICH, D.F. [Kalynovych, D.F.]; KOVENSKIY, I.I. [Kovens'kyi, I.I.]; PEN'KOVSKIY, V.V. [Pen'kovs'kyi, V.V.]

Migration of the components of solid solutions of metals in the field of a direct current. Part 3 [with summary in English]. Ukr.fiz.zhur. 3 no.4:552-559 Jl-Ag '58. (MIRA 11:12)

1. Institut metallokeramiki i spetsial'nykh splavov AN USSR.
(Diffusion) (Solution, Solid) (Iron)

21-58-7-12/27

AUTHORS: Frantsevich, I.N., Corresponding Member of the AS UkrSSR, Kalinovich, D.F., Kovenskiy, I.I., Pen'kovskiy, V.V. and Smolin, M.D.

TITLE: Electrodiffusion of Tungsten in an Iron - Tungsten Alloy (Elektrodiffuziya vol'frama v splave zhelezo - vol'fram)

PERIODICAL: Dopovidi Akademii nauk Ukrains'koi RSR, 1958, Nr 7, pp 736-739 (USSR)

ABSTRACT: The role which is played in highly heat-resistant alloys by the increase in the strength of interatomic bonds in metal solid solutions is well known. The strength of interatomic bonds is essentialyy increased by the donor-acceptor interaction between the atoms of elements which compose the alloy. The availability of information on this interaction makes it possible to theoretically base the selection of a composition with optimum characteristics of heat resistance. The electrotransfer method is the best for studying the donor or acceptor ability of the alloy components. This article describes an investigation of tungsten migration in its solid solution in iron being subjected to a constant electric field, which

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21-58-7-12/27

Electrodiffusion of Tungsten in an Iron - Tungsten Alloy

was carried out by means of the radioactive isotope W^{185}. Experiments on electrotransfer were conducted at 900; 950; 1,000; 1,050; 1,100 and 1.150°C, and at exposure times from 40 to 110 hours. It has been established that in the solid metal solution of tungsten in iron, the former migrates, under the action of a constant electric field, towards the cathode. On the basis of experimental data, velocities of the tungsten atom displacements have been computed, as well as the charges of tungsten ions and transfer ratios at all investigated temperatures. It has been shown that the migration speed and transfer ratio values increase with an increase of temperature from 900 to 1,000°C while the charge remains constant. At a further

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Electrodiffusion of Tungsten in an Iron - Tungsten Alloy

rise of temperature all these quantities decrease and reach zero at 1,150°C. There are 2 graphs, 1 table and 3 Soviet references.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR (Institute of Metalloceramics and Special Alloys of the AS UkrSSR)

SUBMITTED: February 15, 1958

NOTE: Russian title and Russian names of individuals and institutions appearing in this article have been used in the transliteration

1. Iron-tungsten alloys--Diffusion 2. Iron-tungsten alloys--Temperature factors 3. Tungsten isotopes (Radioactive)--Applications

AUTHORS: Frantsevich, I. N., ~~Kalinovich, D. F.,~~ SOV/2o-121-2-23/53
Kovenskiy, I. I., Pen'kovskiy, V. V.

TITLE: The Role of Iron as an Acceptor in an Iron-Carbon Alloy
(Ob aktseptornoy roli zheleza v zhelezo-uglerodistom splave)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol. 121, Nr 2,
pp. 277 - 279 (USSR)

ABSTRACT: The stability of the interatomic binding in the crystal lattice is essentially important for a number of properties as e.g. the heat resistance. The stability of the binding depends on the donor-acceptor interaction of the atoms of the alloyed components with the atoms of the base metal of an alloy. From the number of indirect methods of investigating the donor-acceptor interaction (X-ray structure-, magnetic-, thermochemical analysis, measurement of the electric resistance etc.) the most effective method is that of electric transfer - the migration of the atoms of the alloy component in a steady electric field. In their investigation the authors used samples of Fe-C-alloys with 0,6 mm diameter and 60 mm length, produced from electrolytic iron with 1% C; the central

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parts of the samples were covered electrolytically by radioactive Fe^{59}. The coordinates of the radioactive investigation zones were measured by means of a comparator. The investigations were carried out in the temperature range of from 900 to 1100°C, the samples were exposed to these temperatures for from 12 to 40 hours. The displacement of the boundaries of the activated zones is in the order of some tenths of a mm up to some mm (the displacement of the anode boundary is almost ten times higher than the displacement of the cathode boundary, if $T < 1000^{\circ}$), the velocity of displacement of the zone boundaries is about some 10^{-6}cm/sec and decreases with increasing T. If T = 1100°C a migration practically does not take place any longer (see Table 1)There are 1 figure, 1 table, and 15 references, 6 of which are Soviet.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov Akademii nauk USSR(Institute of Powder Metallurgy and Special Alloys,AS UkrSSR)

The Role of Iron as an Acceptor in an Iron-Carbon Alloy SOV/2o-121-2-23/53

PRESENTED: January 15, 1958, by G.V.Kurdyumov, Member, Academy of Sciences, USSR

SUBMITTED: January 8, 1958

Card 3/3

FRANTSEVICH, I.N.; KALINOVICH, D.F.; KOVENSKIY, I.I.; SMOLIN, M.D.

Some quantitative relationships of donor-acceptor interactions in alloys. Fiz.tver.tela 1 no.1:62-66 Ja '59. (MIRA 12:4)
(Alloys) (Electrons)

SOV/180 59-1-13/29

AUTHORS: Kalinovich D.F., Kovenskiy I.I., Smolin M.D. and Frantsevich I.N. (Kiyev)

TITLE: Investigation of the Migration of the Components of an Iron-Tungsten Alloy in a Constant Electric Field (Issledovaniye migratsii komponentov splava zhelezo-vol'fram v postoyannom elektricheskom pole)

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1959, Nr 1, pp 71-74 (USSR)

ABSTRACT: The authors point out that one of the best methods for studying the donor-acceptor electron interaction in alloys is to study the migration of the components under the action of an el ectric field. In the published data for solid metal alloys, however, only one component is considered and the possibility of donor-acceptor interaction is not examined. The authors describe their own work on the transfer of the components of a solid solution of 5 wt. % tungsten in iron. For studying the diffusion of tungsten W^{185} was introduced by diffusion into the central part of an electrolytic-iron wire 60 mm long and 0.6 mm in diameter. The activity was determined along the test piece before and after its heating by the

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Investigation of the Migration of the Components of an Iron-Tungsten Alloy in a Constant Electric Field

passage of a direct current. For studying the mobility of iron, the normal isotope of tungsten was introduced by diffusion into a similar specimen (diameter 0.65 mm) over its whole length. Fe^{59} was then deposited electrolytically on the central zone of the specimens and the distribution of this radioactive isotope over the cross-section was secured by annealing. After heating by the passage of a direct current the wire was cut into sections whose activities were determined. The heating temperatures were 900, 950, 1000, 1050, 1100 and 1150°C ± 5-7°C, the times being 40-110 hours for the tungsten mobility and 10-40 for the iron mobility experiments. Fig 1 shows typical distributions of activity along the length of the specimen for Fe - W^{185} (950°C, 40 hours); Fig 2 the distributions for Fe - W - Fe^{59}. The distribution obtained when an alternating current was used is shown in Fig 3. The authors determine the transfer numbers of tungsten and iron for the various temperatures on the basis of equations previously deduced (Ref 1) and published data on diffusion coefficients (Ref 2).

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SOV/180-59-1-13/29

Investigation of the Migration of the Components of an Iron-Tungsten Alloy in a Constant Electric Field

They conclude that it has been shown that at 900-1100°C the valency electrons contributed by tungsten atoms go to fill the vacant 3d-levels of iron atoms, producing a donor-acceptor interaction.

Card 3/3 There are 3 figures, 1 table and 3 Soviet references.

SUBMITTED: June 4, 1958

18(4) SOV/170-59-4-7/20

AUTHORS: Frantsevich, I.N., Kalinovich, D.F., Kovenskiy, I.I., Smolin, M.D.

TITLE: On Electrical Transfer of Tungsten in Nickel-Tungsten Alloys (Ob elektroperenose vol'frama v nikelevol'framovom splave)

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, 1959, Nr 4, pp 47-51 (USSR)

ABSTRACT: The present paper describes the results of investigations into electrical transfer of tungsten in solid solution in nickel. Experiments were performed with pieces of nickel wire 0.61 mm in diameter and 60 mm long. Tungsten marked with radioactive W^{185}- isotope was introduced into the central portions of the specimens by diffusion. The tungsten content in these portions amounted to 0.54 per cent by weight. The tungsten transfer through a constant electric field was studied at temperatures of 850, 900, 950, 1,000, 1,050 and 1,100°C. It was shown that tungsten atoms migrate towards the cathode, i.e., in the alloy under investigation they are donors of electrons. Charges on tungsten ions and the numbers of electrons transferred are calculated by formulae derived by the authors. It turned out that the effect of electrical transfer increases with an increase in temperature from 850 to 950°C, and then begins to fall reaching

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67689

18.7500 SOV/126-8-4-11/22

AUTHORS: Frantsevich, I.N., Kalinovich, D.F., and Kovenskiy, I.I.

TITLE: The State of Carbon and Iron in Steel

PERIODICAL: Fizika metallov i metallovedeniye, 1959, Vol 8, Nr 4, pp 574-578 (USSR)

ABSTRACT: The authors point out that much of the work (Refs 1-8) on the ionic nature of carbon in alpha and gamma iron had the disadvantage that the migration of carbon was found indirectly, and that some methodological deficiencies also occurred. This and other (Ref 9) work indicates that in austenite there are positive carbon ions, considered by some authors (Refs 8, 9) to have a charge of 3 to 4 units. Hume-Rothery (V. Yum-Rozeri) (Ref 10), however, has a different theory, which the authors' present work has contradicted. This was carried out using radioactive isotopes C^{14} and Fe^{59}, one of which was introduced in the middle part of the wire specimen. After prolonged high-temperature treating by the passage of a direct current the shift of the radioactive zone was determined. A typical activity vs distance curve for 8 hours at 1100 °C is shown in Fig 1. Experiments were carried out at 950, 1000, 1050, 1100

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The State of Carbon and Iron in Steel

and 1150 °C, the specimens being pure iron. The effects of ordinary diffusion were allowed for by parallel experiments with alternating current. All tests showed that all the carbon in the austenite participates in the movement: contrary to Hume-Rothery's views no negative carbon ions are present. This is confirmed by microstructures of the specimen cross sections, showing that the anodic zone is completely decarburized by passing direct current. For studying migration of iron the radioactive iron isotope was introduced into a wire specimen carburized uniformly over its whole length with stable carbon. Experiments were carried out at 900, 950, 1000, 1050 and 1100 °C, a typical activity vs distance curve (30 hours at 950 °C) being shown in Fig 3. Calculations using an equation previously published by two of the authors (Ref 13) show that the carbon atoms in the austenite lattice participating in the migration have only 1.4 electrons each over the whole temperature range studied. The iron atoms at 900 °C accept 4 electrons each, 3.5 at 950 °C, 3.0 at 1000, 2.2 at 1050, and none at 1150 °C. The authors discuss the donor and

The State of Carbon and Iron in Steel

acceptor roles of the atoms of the added element in a metallic solid solution, coming to conclusion in harmony with modern ideas on the electronic structure of such solutions (Ref 15).
There are 3 figures and 15 references, 10 of which are Soviet, 4 English and 1 is German.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN SSSR
(Institute of Cermets and Special Alloys, Ac.Sc. USSR)

Card 3/3

SUBMITTED: August 25, 1958

FRANTSEVICH, I.N.; KALINOVICH, D.F.; KOVENSKIY, I.I.; SMOLIN, M.D.

Donor-acceptor interaction of components in a binary iron-chromium alloy. Inzh.-fiz. zhur. no.9:62-68 S '59. (MIRA 13:1)

1.Institut metallokeramiki i spetsial'nykh splavov AN USSR, g.Kiyev.
(Iron-chromium alloys)

Kalinovich, D. F.

S/170/60/003/008/009/014
B019/B054

AUTHORS: Glinchuk, M. D., Kalinovich, D. F., Kovenskiy, I. I., Smolin, M. D.

TITLE: A Method of Determining Diffusion Coefficients in Solids

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, 1960, Vol. 3, No. 8, pp. 78 - 81

TEXT: The authors investigate diffusion along an infinitely long cylinder with the radius R. It is assumed that at the beginning the diffusing substance is distributed at one end of the cylinder in a thickness ΔR and a width of 21. The authors proceed from the diffusion equation (1) and obtain the approximate equation (4) for the distribution of concentration along the cylinder. Equation (5) indicates the concentration distribution of the diffusing substance after diffusion at the temperatures T_1 and T_2 for the durations t_1 and t_2, and the diffusion coefficients D_1 and D_2 are calculated from (4) and (5). Formula (7) gives the quantity of the substance diffused. By the method suggested here, the

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A Method of Determining Diffusion Coefficients in Solids

S/170/60/003/008/009/014
B019/B054

authors determined the diffusion coefficient of chromium in nickel. Table 1 gives the mean values of the diffusion coefficients for various temperatures. The diffusion coefficients were calculated by formula (9). Fig. 2 graphically shows the diffusion coefficient of chromium in nickel as a temperature function. The method suggested allows the determination of diffusion coefficients for various temperatures on a sample. The accuracy is designated to be satisfactory. There are 2 figures, 1 table, and 2 Soviet references.

ASSOCIATION: Institut metallokeramiki i spetssplavov AN USSR, g. Kiyev (Institute of Powder Metallurgy and Special Alloys of the AS UkrSSR, Kiev)

SUBMITTED: March 8, 1959

Card 2/2

KALINOVICH, D.F.

81902

18.1250

S/126/60/010/01/004/019
E111/E335

AUTHORS: Kalinovich, D.F., Kovenskiy, I.I., Smolin, M.D. and Frantsevich, I.N.

TITLE: Mobility of Chromium Atoms in a Nickel-chromium Alloy Under the Action of a Direct Electric Field

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol.10, No. 1, pp 42 - 46

TEXT: The authors point out that the study of migration of ions in alloys can give indications of the high-temperature stabilizing role of alloying elements. They describe their work on the migration of chromium in a 0.63 diameter, 60 mm long wire containing 4.36% by weight. The central part of the specimens was electrolytically coated with a 5-micron thick layer of Cr^{51}. After annealing at 1200 °C for 60 hours, the specimens were electrolytically etched to remove the surface layer. Longitudinal radioactivity distribution was measured with an MST-17 counter. Specimens were then placed in an argon atmosphere and a direct current passed through them. Activity-versus-position plots before and after passage of current at 1000 °C for 120 hours (Fig.1) and for 950, 1000, 1050 and 1100 °C

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81902

S/126/60/010/01/004/019
E111/E335

Mobility of Chromium Atoms in a Nickel-chromium Alloy Under the Action of a Direct Electric Field

showed appreciable migration of chromium towards the cathode. Allowing for diffusion the authors calculate the speed of migration of chromium (average values rise from 2.70×10^{-8} at 950 to 29.71×10^{-8} cm/sec at 1100 °C). By removing the outer layer of treated specimens and repeating the activity measurements (Figure 2), migration within the specimen was found to be less than near the surface (7.20×10^{-9} - 1.55×10^{-8} cm/sec). For both there was a linear relation between the average displacement of the chromized-zone boundary and duration of experiment. Using Einstein's equation (Ref.4) the authors calculate effective chromium-ion charge values in solid solution in nickel to be 57.6, 42.5, 34.7 and 27.6 at 950, 1000, 1050 and 1100 °C, respectively, which is in line with Wever's values for higher temperatures (Ref.6).
There are 2 figures, 2 tables and 6 references: 2 Soviet, 2 English and 2 German.

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81902

S/126/60/010/01/004/019
E111/E335

Mobility of Chromium Atoms in a Nickel-chromium Alloy Under the Action of a Direct Electric Field

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN USSR (Institute of Cermets and Special Alloys of the Ac.Sc. Ukrainian SSR)

SUBMITTED: January 16, 1960

4

Card 3/3

S/181/61/003/011/019/056
B125/B104

AUTHORS: Kalinovich, D. F., Kovenskiy, I. I., and Smolin, M. D.

TITLE: A contribution to the problem of determining partial velocities of electrical transfer with tagged atoms

PERIODICAL: Fizika tverdogo tela, v. 3, no. 11, 1961, 3367-3370

TEXT: To determine the velocity of motion of a tagged ion during electrical transfer it is necessary to have a coordinate system firmly connected with a fixed point. The origin of coordinates can be put at one end of the sample or at a mark which is located in a nonheated area (the mark can be obtained by the impression of a microhardness test). When investigating the electrical transfer of each alloy component, it is possible to tag the components to be studied either along the whole sample or only along a narrow part in the center of the heated zone with a radioisotope. In the first case, a new distribution of the concentration of the component in question is observed, while in the other case the motion of atoms of this component during electrical transfer is observed directly. Under such

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A contribution to the problem of ...

conditions, the temperature distribution curve will pass through two symmetrical points in regions with a strong decrease along the sample. In these points, the mobility of atoms is practically zero. The following two cases were investigated: (1) If migration of atoms of all components in one direction is observed, ions of all components will arrive at the boundary surface of the mass flux which is located in the direction of transfer. New lattice planes are formed. Simultaneously, atomic planes are removed at the boundary of the heated zone located on the opposite side. Therefore, all atomic planes located in the heated region are shifted opposite to the direction of transfer by the width of the built-up or removed zone. The equation of displacement is given by $U=\sum_i \gamma_i u_i$ (1), where $\Delta x/t = \sum_i v_i \gamma_i$ (2). U denotes the total transfer number; u_i, v_i, and γ_i denote partial transfer numbers, velocity, and molar share of the i-th component; Δx denotes the width of the built-up (removed) zone; t denotes the duration of test. $\Delta x/t$ may be regarded as the total transfer velocity. The shift measured during electrical transfer for a tagged

A contribution to the problem of ...

atom in the heated zone is equal to the sum of shifts due to partial and total transfer: $v_i = v_i^* + W$ (3), where v_i^* denotes the velocity determined experimentally from the shift of the tagged atom. In the case studied, a transfer of matter will always take place. (2) Atoms of the components will migrate in both directions. In both regions limiting the flux, atoms of one type are supplied and atoms of the other type are removed. Under these conditions, Eqs. (1) and (2) will also describe the total mass transfer in general. When determining partial velocities of electrical transfer with tagged atoms, the motion of these atoms has to be considered. The method of tagged atoms shows various advantages over the method of fixed marks. Especially, a chemical analysis of plate and cathode space of the sample is not required. All conclusions in this paper are only valid if the geometrical shape of samples does not change during the tests. There are 3 non-Soviet references. The reference to the English-language publication reads as follows: R. P. Johnson. Phys. Rev., 54, 459, 1938.

Card 3/4

S/181/61/003/011/019/056
B125/B104

A contribution to the problem of ...

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN USSR Kiyev (Institute of Powder Metallurgy and Special Alloys AS UkrSSR, Kiyev)

SUBMITTED: June 5, 1961

Card 4/4

22826
S/170/61/004/005/012/015
B111/B214

18.7500 1145 1555

AUTHORS: Kalinovich, D. F., Kovenskiy, I. I., Smolin, M. D., Frantsevich, I. N.

TITLE: The diffusion of nickel in a nickel molybdenum alloy in an electric field

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, v. 4, no. 5, 1961, 108-110

TEXT: The electric field produces a directed displacement of the atomic shell in the crystal lattice of a pure metal and solid solutions. Two forces act on the ions: the electric field and a force depending on the momentum transition between ions and the conduction electrons or holes. The electrotransportation of Ni ions in a solid solution of molybdenum in nickel is investigated in this paper (molybdenum content 9.24% by weight). The tracer was Ni^{63} which was measured by a counter of the type T25-БФЛ (T25-BFL). The temperature of the sample was measured by a pyrometer of the type ХГИМИП (KhGIMIP). The direction and rate of electrotransportation could be determined from the displacement of the boundary of the radioactive zone. The diffusion was eliminated by relating the rate of electrotransportation

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The diffusion ...

to the arithmetic mean of the displacement of the boundary of the active zone. The force acting on an ion may be written as

$$F = Ee(z - n_1\sigma_1 l_1 + n_2\sigma_2 l_2),$$

where E is the potential; e the electronic charge; z the charge of the ion in multiples of e; n_1 concentration of the conduction electrons; σ_1.. the scattering cross section of the conduction electrons on the migrating ion; and l_1.. the mean free path of the electrons on the Fermi surface. The index 2 denotes hole conductivity. The quantity $z - n_1\sigma_1 l_1 + n_2\sigma_2 l_2 = z$ is the effective charge which is equal to the true charge in the absence of the effect of electrons and holes. Applying Einstein's formula one may write for the effective charge z^*: $z^* = 300\ v\lambda qkTf/IDe$ (2), where v is the rate of electrotransportation; λ, q the electrical conductivity and area of the cross section of the sample; f = 0.78 (for a face centered lattice); I the current strength; and D the diffusion coefficient. The derivation of the diffusion coefficient has been given in IFZh, No. 8, 78, 1960. The value found is $D = 2.68 \exp(-65600/RT)$. The experimental conditions, the rates of electrotransportation, and the effective charges

The diffusion ...

calculated according to (2) are collected in Table 1. All the experiments showed that nickel migrates to the anode. There are 1 table and 10 references: 6 Soviet-bloc and 4 non-Soviet-bloc. The three most recent references to English-language publications read as follows: 1) Compaan, K., Haven G.: Trans. Faraday Soc., 52, 786, 1956; 2) Wever H.: Proc. of Symp. No. 9 of Phys. Chem., 21, 2, 1958.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN USSR g. Kiyev (Institute of Powder Metallurgy and Special Alloys AS UkrSSR, Kiyev)

SUBMITTED: September 30, 1960

Температура, °C (1)	Время опыта, час (2)	Скорость переноса (3) см/сек	Эффективный заряд (4)
1150	200	$1,36 \cdot 10^{-4}$	23,7
1200	150	$2,22 \cdot 10^{-4}$	20,9
1250	100	$4,16 \cdot 10^{-4}$	18,0
1300	100	$7,36 \cdot 10^{-4}$	15,0

Legend to Table 1:
1 - Temperature in °C; 2 - experimental time in hours; 3 - rate of electrotransportation in cm/sec; 4 - effective charge.

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S/126/61/011/002/020/025
E021/E435

AUTHORS: Kalinovich, D.F., Kovenskiy, I.I. and Smolin, M.D.

TITLE: Diffusion and Electrotransfer of Chromium into Molybdenum

PERIODICAL: Fizika metallov i metallovedeniye, 1961, Vol.11, No.2, pp.307-309

TEXT: The electrotransfer of chromium into molybdenum in the solid state was investigated. Pure molybdenum wire samples, 0.5 mm diameter and 60 mm length, were saturated with the stable isotope of chromium by diffusion to a chromium content of 9.92 wt.%. The central 3 mm of wire were covered with a thin film of radioactive Cr^{51}. The wire was then annealed in a protective atmosphere at 1400°C to give uniform distribution across the section. The distribution of Cr^{51} along the length of the wire was then found by measuring the activity of portions 0.1 mm in width. A direct current was then passed through the wire which was surrounded by argon. This heated the wire to a chosen temperature, measured by an optical pyrometer. Then the distribution of Cr^{51} was again measured. The graph shows the

distribution before and after heating. Experiments were carried out at 1200, 1250, 1300 and 1350°C and in all cases migration of the chromium occurred towards the cathode. The amount of electrotransfer depended linearly on the length of the experiment and increased with increase in temperature. The rates were as follows:

Temperature, °C	1200	1250	1300	1350
Rate of electro-transfer (cm/sec)	1.5×10^{-8}	2.6×10^{-8}	4.2×10^{-8}	7.1×10^{-8}

The coefficient of diffusion was found and it obeyed the following relationship:

$$D = 4.3 \exp(-72700/RT) \text{ cm}^2/\text{sec}.$$

The rate of transfer was measured with an accuracy of ± 5 to 8% and the coefficient of diffusion with ± 8%. There are 1 figure and 2 Soviet references.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR (Institute of Powder Metallurgy and Special Alloys AS UkrSSR)

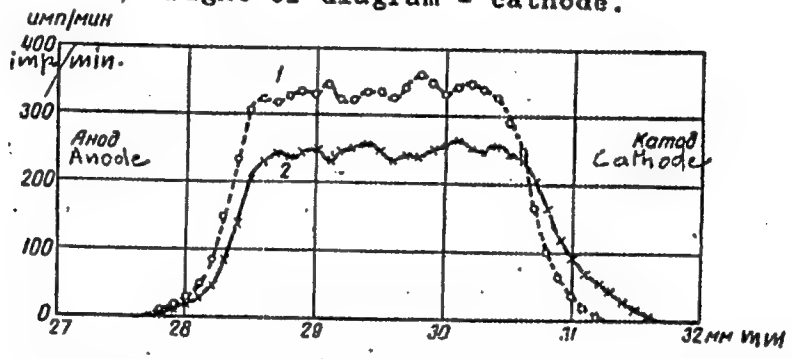
Diffusion and ...

S/126/61/011/002/020/025
E021/E435

SUBMITTED: June 3, 1960

Figure. Displacement of the Radioactive zone during heating by a direct current to 1300°C for 150 h in the Mo-Cr^{51} system, imp/min vs mm

left of diagram - anode; right of diagram - cathode.



Система Mo—Cr^{51}. Смещение границ радиоактивной зоны при нагреве образца постоянным током при 1300° С в течение 150 часов:
1—до нагрева; 2—после нагрева.

Card 3/3

39765
S/126/62/013/006/014/018
E193/E383

24.7500

AUTHORS: Kalinovich, D.F., Kovenskiy, I.I. and Smolin, M.D.

TITLE: Electrotransport of tungsten in cobalt

PERIODICAL: Fizika metallov i metallovedeniye, v.13, no. 6, 1962, 930 - 931

TEXT: The mobility of metal ions in a metal in a constant electrical field depends both on the diffusion mobility and on the characteristics of interaction between the ions, on the one hand, and the electrons and holes, on the other. Useful information on the mechanism of the diffusion and electrical conduction can therefore be obtained from studies of mobility of ions and the object of the present investigation was to study the electrotransport of tungsten in a cobalt alloy containing 99.48% Co, 0.24% Ni, 0.03% C, 0.04% O, 0.01% C, 0.02% Si and 0.14% Fe. Tungsten was introduced into the experimental specimens (60 mm long, 8.62 mm in diameter) by diffusion-annealing (150 hours at 1 200 °C) in tungsten powder, dry argon being used as the protective atmosphere. This treatment was followed by homogenizing annealing (80 hours at 1 350 °C),

Card 1/0 3

Electrotransport ....

after which the tungsten content of the alloy was 0.82 wt.%. After electrodepositing a thin layer of the radioactive isotope W^{185} around the circumference in the middle of a specimen, it was sealed in an argon-filled tube and connected to a DC source, the electric current serving both to heat the specimen to the required temperature (in the 1 100 - 1 350 °C range) and to set up an electrical field, each test lasting 150 hours. The sign and extent of electrotransport was determined from the distribution of radioactivity along the specimen before and after each test. Typical results are reproduced in Fig. 1, where the radioactivity (pulses per minute) is plotted against the distance (mm) from the anode end of the specimen, the circles and crosses relating, respectively, to results obtained before and after the test which consisted of 120 hours at 1 200 °C. The absolute values of the rate of electrotransport of tungsten in cobalt, calculated from the experimental results, increased from 2.84×10^{-9} at 1 100 °C to 1.56×10^{-7} cm/sec at 135 °C.

Card 2/6 3

S/126/62/013/006/014/018
E193/E383

Electrotransport ....

The effective charge of the tungsten ions, calculated from the known Einstein relationship, was found to be of the order of tens of electron units, which indicated the predominant part played by the hole "wind" in determining the sign of the electrotransport in the case under consideration.
There is 1 figure.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR (Institute of Powder Metallurgy and Special Alloys of the AS UkrSSR)

SUBMITTED: February 12, 1962

Card 3/3

S/849/62/000/000/008/016
A006/A101

AUTHORS: Frantsevich, I. N., Kalinovich, D. F., Kovenskiy, I. I., Smolin, M. D.

TITLE: On the behavior of components of metallic solid solutions in an electric force field

SOURCE: Vysokotemperaturnyye metallokeramicheskiye materialy. Inst. metalloker. i spets. spl. AN Ukr.SSR, Kiev, Izd-vo AN Ukr.SSR, 1962, 75 - 83

TEXT: The method of electric migration makes it possible to estimate directly the donor-acceptor interaction in metallic solid solutions. Previous studies were directed on the electric migration of the alloying component, without investigating the behavior of the base metal atoms; in a constant electric field the possibility of a donor-acceptor interaction between the atoms of the components was not taken into account. In the present article the authors studied the mutual electric migration of both components of some binary alloys, such as Fe-C, Fe-Cr, Fe-W, Ni-W and Fe-Mo, using the method of radio-active iso-

Card 1/4

On the behavior of components of...

topes. The component under investigation was marked with the corresponding radioactive isotope and introduced into the central section of wire specimens, 0.6 mm in diameter and 60 mm long. The distribution of radioactivity over the specimen length was measured prior to and after electric heating. Activity graphs were plotted to determine the orientation and dislocation of the radioactive zone boundaries during the process of electric migration. It was found that carbon, chromium and tungsten migrated under the effect of the electric field towards the cathode. Molybdenum migrates toward the anode and is, contrary to C, Cr and W, an electron acceptor. The electric migration of Fe in binary solutions of C, Cr and W in iron was found to be directed toward the anode, but only a portion of Fe atoms, proportional to the amount of donor-atoms of the admixture component, participated in the migration. On the basis of experimental data obtained, migration rates of the investigated components were calculated and tabulated (Table). The experiments show that a donor-acceptor interaction exists between the components of the Fe-C, Fe-Cr and Fe-W systems. The donor or acceptor nature of admixture atoms is predetermined by the mutual position of energy levels of incomplete shell electrons of the admixture atom, and the Fermi level of the base electron spectrum. The appearance in the lattice of admixture

S/849/62/000/000/008/016
A006/A101

On the behavior of components of...

atoms with excess charge is connected with the deformation of energy bands of conductivity near these atoms, and the formation of a charge of the opposite sign, screening the excess charge of the admixture. This screening charge is partially distributed in the conductivity band, and partially in the band corresponding to the internal incomplete shell of the base atom. The temperature dependence of the electric migration effect is explained by the dispersing effect upon the electrons of the conductivity zone of atoms, which are in a state of thermal oscillation at the crystal lattice points, and also by changes in the degree of the donor-acceptor interaction. It can be assumed that the magnitude of the electric migration effect depends upon the correlation between the external electric field forces and the forces resulting from the transfer by conductivity electrons of oriented pulses to the ions. There are 4 figures and 1 table.

Card 3/4

On the behavior of components of...

Table. Migration rates of metal alloy components under the effect of an electric field, in v-cm/sec

Alloy investigated	Migrated element	Experimental temperature in °C							
		850	900	950	1000	1050	1100	1150	1200
Fe — C	C	—	—	$8{,}06\cdot10^{-6}$	$11{,}67\cdot10^{-6}$	$14{,}44\cdot10^{-6}$	$31{,}39\cdot10^{-6}$	$39{,}14\cdot10^{-6}$	—
Fe — C	Fe	—	$3{,}41\cdot10^{-6}$	$2{,}51\cdot10^{-6}$	$1{,}39\cdot10^{-6}$	$0{,}57\cdot10^{-6}$	0	—	—
Fe — Cr	Cr	—	—	—	$6{,}8\cdot10^{-7}$	$9{,}4\cdot10^{-7}$	$12{,}5\cdot10^{-7}$	$18{,}8\cdot10^{-7}$	—
Fe — Cr	Fe	—	$3{,}00\cdot10^{-7}$	$4{,}01\cdot10^{-7}$	$4{,}87\cdot10^{-7}$	$6{,}26\cdot10^{-7}$	$5{,}35\cdot10^{-7}$	$44{,}4\cdot10^{-7}$	$2{,}18\cdot10^{-7}$
Fe — W	W	—	$4{,}72\cdot10^{-7}$	$6{,}37\cdot10^{-7}$	$8{,}80\cdot10^{-7}$	$5{,}68\cdot10^{-7}$	$1{,}35\cdot10^{-7}$	0	—
Fe — W	Fe	—	$1{,}25\cdot10^{-6}$	$1{,}67\cdot10^{-6}$	$2{,}44\cdot10^{-6}$	$1{,}50\cdot10^{-6}$	$0{,}32\cdot10^{-6}$	0	—
Ni — W	W	$1{,}25\cdot10$	$2{,}78\cdot10^{-7}$	$3{,}89\cdot10^{-7}$	$1{,}86\cdot10^{-7}$	$0{,}72\cdot10^{-7}$	0	—	—
Fe — Mo	Mo	—	—	$4{,}40\cdot10^{-7}$	$5{,}63\cdot10^{-7}$	$7{,}23\cdot10^{-7}$	$7{,}78\cdot10^{-7}$	—	—

KALINOVICH, D.F.; KOVENSKIY, I.I.; SMOLIN, M.D.

Electron transfer of tungsten in cobalt. Fiz. met. i metalloved. 13 no.6:930-931 Je '62. (MIRA 15:7)

1. Institut metallokeramiki i spetsial'nykh splavov AN USSR.
(Cobalt-tungsten alloys)
(Electrons)

L 11259-63 EWT(m)/BDS--AFFTC/ASD
ACCESSION NR: AP3000596 S/0181/63/005/005/1238/1242

AUTHOR: Frantsevich, I. N.; Kalinovich, D. F.; Kovenskiy, I. I.; Smolin, M. D.

TITLE: Relative and total transfer of substance in metals under the influence of direct current

SOURCE: Fizika tverdogo tela, v. 5, no. 5, 1963, 1238-1242

TOPIC TAGS: electrotransference, transference numbers, alloys, Ag, Zn

ABSTRACT: The total and fractional velocities of transference and the transference numbers were determined for Ag-Zn alloys. Measurements were made on alloys with 25, 35, and 50 atomic % zinc. Rods 1 mm in diameter and 70 mm long were used, the two with lowest zinc content being coated electrolytically with the radioisotope Ag sup 110 and the third being marked in the same manner with Zn sup 65. All samples were annealed to produce uniform distribution of the radioisotopes. The distribution of radioactivity was then measured along the length of the rods and was found to be uniform over the entire length. Direct current was then sent through the rods, which were placed in a neutral atmosphere (argon); the rods were simultaneously heated to 550C, and the experiment continued for 200 hours. The results show that in the first two alloys, belonging to the Alpha region, the velocity of electrotransference is greater for silver than for zinc. In the third sample (the

Card 1/2

L 11259-63
ACCESSION NR: AP3000596

2

Beta region of solid solution) the relations are reversed. The author concludes that in using radioactive tracers to measure the electrotransference of the two components of a binary alloy, it is sufficient to use tracer atoms of but one of the components. Orig. art. has: 9 formulas, 1 figure, and 1 table.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov, AN UkrSSR, Kiev (Institute of Metal Ceramics and Special Alloys, Academy of Sciences UkrSSR)

SUBMITTED: 11Oct62 DATE ACQ: 11Jun63 ENCL: 00

SUB CODE: PH, ML NO REF SOV: 001 OTHER: 002

lb/wm
Card 2/2

L 18008-63 EWP(q)/EWT(m)/BDS AFFTC/ASD JD/JG
ACCESSION NR: AP3001298 S/0181/63/005/006/1728/1730

AUTHORS: Frantsevich, I. N.; Kalinovich, D. F.; Kovenskiy, I.I.; Smolin, M. D.

TITLE: Determining the degree of ionization of components in Mo-W alloy

SOURCE: Fizika tverdogo tela, v. 5, no. 6, 1963, 1728-1730

TOPIC TAGS: ionization, alloy, Mo, W, donor, acceptor, interaction, effective charge, radioactive isotope

ABSTRACT: The metal studied was Mo alloyed with 15 atomic % W. Thin wire samples, 0.5 mm in diameter and about 70 mm long, were prepared from this alloy, and in the middle part of each sample a thin layer of radioactive isotope (Mo^{99} or W^{185}) was deposited. The length of this coated segment was about 3 mm. The method of determining rate of movement of the radioactive zone has been described previously by D. F. Kalinovich, I. I. Kovenskiy, and M. D. Smolin (FTT, 3, 3367, 1961). Investigations were made in the temperature ranges 1773-2473K for W and 1973-2573K for Mo at 100° intervals. At all temperatures the Mo ions migrated toward the anode, the W ions toward the cathode. The values for effective charges indicate that the predominant effect in transfer of W ions

Card 1/2

L 18008-63
ACCESSION NR: AP3001298

is hole movement, that of Mo ions, electron movement. The data show that a definite proportion of the electrons supplied to the collective fund by Mo atoms migrate to W atoms. These electrons apparently contribute to the partial build-up of an imperfect 5d band in the W atoms. Thus, a donor-acceptor interaction takes place in the alloy. Orig. art. has: 3 tables and 3 formulas.

ASSOCIATION: Institut metallokeramiki i spetsial'ny*kh splavov AN USSR, Kiev (Institute of Powder Metallurgy and Special Alloys, Academy of Sciences, Ukrainian SSR)

SUBMITTED: 02Jan63 DATE ACQ: 01Jul63 ENCL: 00

SUB CODE: PH,ML NO REF SOV: 004 OTHER: 000

Card 2/2

FRANTSEVICH, I.N. [Frantsevych, I.M.]; KALINOVICH, D.F. [Kalynovych, D.F.]; KOVENSKIY, I.I. [Kovens'kyi, I.I.]; SMOLIN, M.D.

Studying the diffusion of the components of a molybdenum-tungsten alloy over a wide temperature range. Ukr. fiz. zhur. 8 no.9:1020-1025 S '63. (MIRA 17:8)

1. Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR, Kiyev.

KALINOVICH, D.F.; KOVENSKIY, I.I.; SMOLIN, M.D.

Investigating electron transfer in binary metal alloys. Fiz. met. i metalloved. 16 no.2:232-235 Ag '63. (MIRA 16:8)

1. Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR.
(Iron-aluminum alloys) (Electrons)

KALINOVICH, D.F.; KOVENSKIY, I.I.; SMOLIN, M.D.

Diffusion of the components of an iron-chromium alloy in a broad range of composition. Fiz. met. i metallovad. 16 no.4:619-620 O '63. (MIRA 16:12)

1. Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR.

ACCESSION NR: AT4045011 S/0000/64/000/000/0171/0176

AUTHOR: Frantsevich, I. N.; D. F., Kalinovich; I. I. Kovenskiy; M. D. Smolin

TITLE: Study of the passage of electricity through metallic solid solutions

SOURCE: Soveshchaniye po probleme Izpol'zoyaniye atomnoy energii, Kiev, 1961. Radiatsionnaya avtomatika, izotopy* i yaderny*ye izlucheniya v nauke i tekhnike (Radiation automation control systems, isotopes, and nuclear radiation in science and technology); doklady* soveshchaniya. Kiev, Izd-vo AN UkrSSR, 1964, 171-176

TOPIC TAGS: electroconductivity, solid solution, solid solution conductivity, metal solid solution, ion migration, electron density, electron vacancy, hole

ABSTRACT: The Institut metallokeramiki i spetsial'ny*kh splavov AN USSR (Institute of Powder Metallurgy and Special Alloys, AN Ukr.SSR) has worked out a method for studying the passage of electricity through solids by means of radioactive isotopes. This method makes it possible to study such passage not only in extrinsic elements but also in basic alloys. Some of the binary systems studied were: iron-carbon, nickel-chromium, cobalt-tungsten, nickel-tungsten, molybdenum-chromium, silver-palladium, etc. The radioactive isotopes used included carbon-14, iron-55, nickel-63, silver-110, etc. The experimental method has been discussed in an earlier paper by the same authors. According to

Card 1/3

ACCESSION NR: AT4045011

a recently-developed theory, ions during migration through solids carry the following effective charge:

$$Z^* = Z - n_- \sigma_- l_- + n_+ \sigma_+ l_+ \qquad (1)$$

where z* is the effective charge, Z is the true ion charge, n is the concentration of the conducting electrons (holes), σ is the electron (hole) scattering cross-section, and l is the length of the electron (hole) free path in the alloy. Values with a minus sign refer to electrons, those with a plus sign, to holes. For greater accuracy in determining the value of the effective charge, all the quantities needed in the calculations by the well-known Einstein formula were experimentally determined for each specimen. The first set of experiments served to obtain the relationship between Z* and temperature; the next set was aimed at obtaining the electron density as a function of the charges of the basic alloy and the admixture and of the concentration of the latter; and the third set yielded the electron and hole cross-sections. The results of these experiments are tabulated, showing a linear inverse relationship between temperature and effective charge, and a direct linear relationship between electron density and both charge and concentration. Orig. art. has: 8 formulas and 3 tables.

ASSOCIATION: None

Card 2/3

ACCESSION NR: AT4045011

SUBMITTED: 07Jan64 ENCL: 00 SUB CODE: EM, SS

NR REF SOV: 004 OTHER: 001

Card 3/3

KALINOVICH D F

L 8487-65 EWT(m)/EPF(c)-2/EPR/EWP(k)/EWP(q)/EWP(b) Pf-4/Pe-4/Pu-4
AFWL/AEDC(a)/SSD/ESD(t) JD/JW/JG

ACCESSION NR: AP4044176 S/0185/64/009/008/0920/0921

AUTHOR: Kaly*novy*ch, D. F.; Kovens'ky*y, I. I.; Spolin, M. D.

TITLE: Mobility of carbon in tungsten at high temperatures

SOURCE: Ukrayins'ky*y fiay*chny*y zhurnal, v. 9, no. 8, 1964, 920-921

TOPIC TAGS: carbon diffusion, diffusion, carbon tungsten alloy, carbon diffusion coefficent, diffusion activation energy

ABSTRACT: Diffusion of carbon in a tungsten alloy containing 0.1 wt% C has been investigated in the 2073—3073K range using radioactive C^{14}. Test specimens, 0.5 mm in diameter and 70 mm long, were annealed in an argon atmosphere. It was found that in the 2073—2873K range the temperature dependence of the diffusion coefficient is linear, $\lg D = f(1/T)$, with parameters $D_0 = 7.22 \cdot 10^{-5}$ cm²/sec and E=159,100 j/mol. In the 2873—3073K range, however, the temperature dependence becomes nonlinear, so that the difference between the experimental and the calculated values of the diffusion coefficients reaches 15, 16.3, and 17.5% at 2873, 2973, and 3073K,

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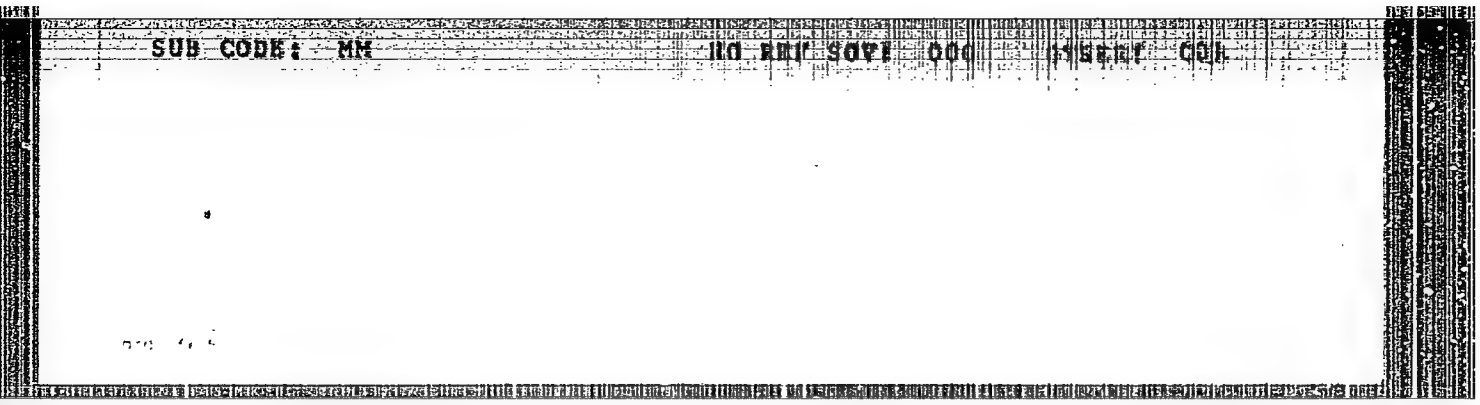
L 8487-65

ACCESSION NR: AP4044176

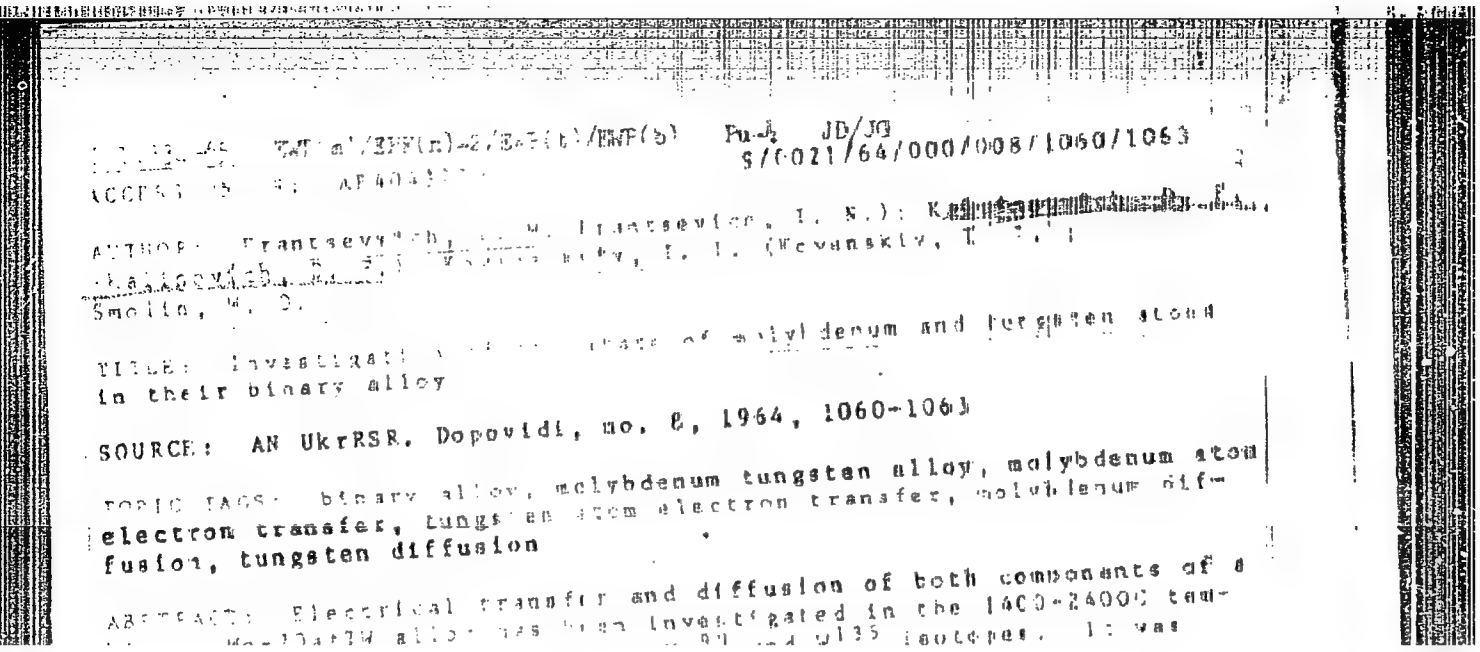
respectively, compared with a difference of 4—11% at lower temperatures. Since no phase transformations occur in the temperature range investigated, the above deviations result from the changes in the diffusion activation energy at temperatures higher than [illegible] and [illegible].



KALINOVICH, D.F. [Kalynovych, D.F.]; KOVENSKIY, I.I. [Kovens'kyi, I.I.]; SMOLIN, N.D.

Partial and total mass transfer in the nickel-chromium system. Ukr. fiz. zhur. 8 no.11:1259-1260 N '64. (MIRA 17:9)

1. Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR, Kiyev.



EWT(m)/EWP(t)/EWP(b) Pu-4 JD/JG
S/0021/64/000/008/1060/1063

ACCESSION NR: AP4043[illegible]

AUTHOR: Frantsevych, I. M. (Frantsevich, I. N.); K[illegible]; Lavrenyuk, I. I. (Lavrenyuk, I. I.); Smolin, M. D.

TITLE: Investigation [illegible] rate of molybdenum and tungsten atoms in their binary alloy

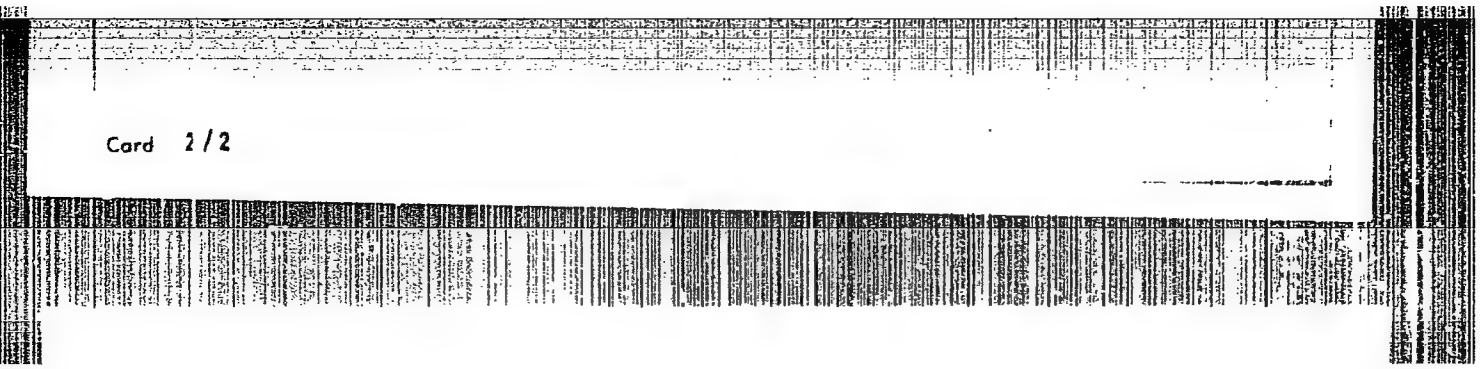
SOURCE: AN UkrRSR. Dopovidi, no. 8, 1964, 1060-1063

TOPIC TAGS: binary alloy, molybdenum tungsten alloy, molybdenum atom electron transfer, tungsten atom electron transfer, molybdenum diffusion, tungsten diffusion

ABSTRACT: Electrical transfer and diffusion of both components of a [illegible] alloy was investigated in the 1400-2400C temperature range using Mo99 and W185 isotopes. It was

L 11336-65
ACCESSION NR: AP4043730

The diffusion coefficient and the activation energy were 1.9 cm^2/sec and 74,600 cal/mol for W, and 146 cm^2/sec for Mo. The data obtained indicate transfer of a definite portion of the electrons from molyb-denum atoms to tungsten atoms. These electrons are probably stea[illegible]



Pravdyuk, I. N.

TITLE: Effect of direct current on steel carburization rate

SOURCE: Metallovedeniyy i termicheskaya obrabotka metallov, no. 12, 1964, 46-47

TOPIC TAGS: steel, steel 20, carburization, carbon diffusion, [illegible]

ABSTRACT: Steel [illegible] mm in diameter and [illegible] mm in length were carburized in a solid carburizer containing C^{14} radioactive isotope at [illegible] for [illegible] hr. [illegible] passed through [illegible] direct current [illegible] effect increases with increasing temperature and duration of carburizing. The carbon diffusion rate is [illegible] times greater with the application of direct current than with conventional carburization.

Card 1/2

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620110020-9"

L 16910-65

ACCESSION NR: AP5000939

[illegible] was uniformly distributed across the width [illegible] of the wire. Orig. art. has: 4 figures and 1 table.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN Ukr[illegible] Institute of Powder Metallurgy and Special Alloys, AN Ukr[illegible]

SUBMITTED: [illegible] ENCL: 00 SUB CODE: [illegible]

NO REF SOV: 004 OTHER: 000 ATD PRESS: 3150

Card 2/2

KALINOVICH, D.F.; KOVENSKIY, I.I.; SMOLIN, M.D.

Diffusive mobility of carbon in tantalum. Fiz. met. i metalloved. 18 no.2:314-315 Ag '64. (MIRA 18:8)

1. Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR.

L 20090-65 EWT(m)/EWP(m) /EPR/T/EWP(t)/EWP(b) Ps-4/Pu-4 IJP(c)/ASD(a)-5/ASD(f)-3/
ACCESSION NR: AP4044161 AS(mp)-2/ S/0126/64/018/002/0314/0315 ASD(m)-3

AUTHOR: Kalinovich, D. F., Kovenskiy, I. I., Smolin, M. D.

TITLE: Diffusibility of carbon in tantalum

SOURCE: Fizika metallov i metallovedeniye, v. 18, no. 2, 1964, 314-315

TOPIC TAGS: diffusibility, carbon, tantalum, activation energy

ABSTRACT: The invariability of the activation energy of the diffusion process (E) was studied within the 873-2873 K temperature range in 70 mm long Ta [illegible] 2873 K respectively. Inasmuch as no phase transformations occur within this temperature range, the deviations may be attributed to the changes in the acti[illegible]

Card 1/2

L 20090-65
ACCESSION NR: AP4044161

tion energy above 800 K . Quantitative results will be obtained after further experiments. Orig. art. has: 1 figure and 1 table

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR (Institute of Powder Metallurgy and Special Alloys, AN UkrSSR)

SUBMITTED: 11Feb64 ENCL: 00

SUB CODE: MM, NP NO REF SOV: 001 OTHER: 000

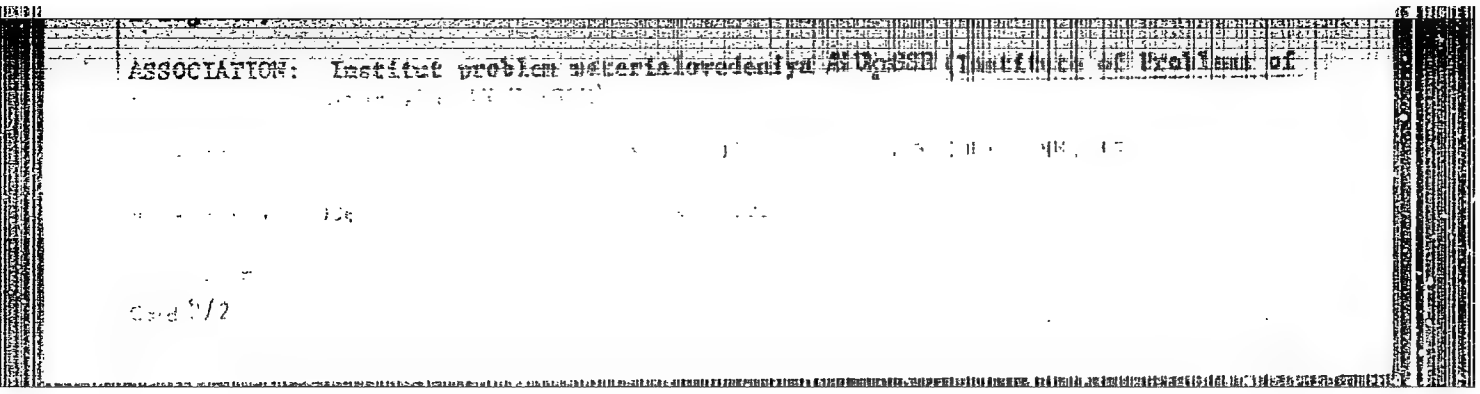
Card 2/2

TOPIC TAGS: diffusion coefficient, activation energy, tungsten molybdenum alloy, [illegible] alloy, interatomic bonding energy, end window radiation counter

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620110020-9"

Card 1/2

ACCESSION NR: AP5010408

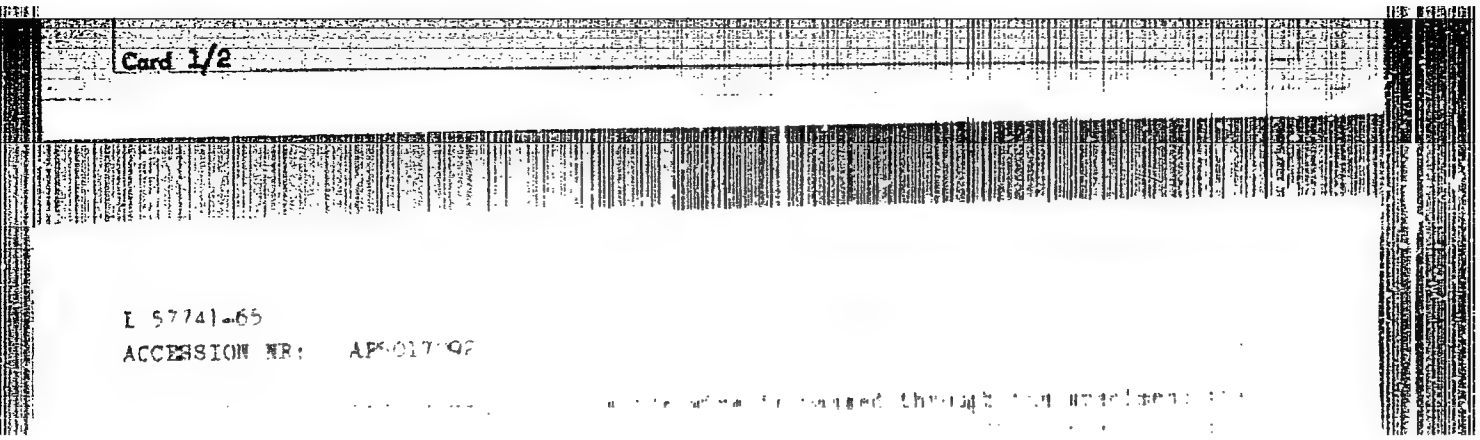


ASSOCIATION: Institut problem materialovedeniya AN USSR (Institute of Problems of

Card 1/2

AUTHOR: Kalinovich, D. F.; Kovenskiy, I. I.; Smolin, M. D.

[illegible] Measuring the electrical conductivity of metals at elevated temperatures



APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620110020-9"

perature, according to the equation

$$\rho = \rho_0(1 + \alpha t),$$

where ρ is the electrical conductivity at $t = 0°C$ and α is the temperature coeffi-

KALINOVICH, D.F. [Kalynovych, D.F.]; KOVENSKIY, I.I. [Kovens'kyi, I.I.]; SMOLIN, M.D.

Diffusion mobility in solid solutions of nickel in iron. Ukr. fiz. zhur. 10 no.8:917-919 Ag '65. (MIRA 18:8)

1. Institut problem materialovedeniya AN UkrSSR, Kiyev.

L 13116-66 EWT(m)/T/EWP(t)/EWP(b)/EWA(c) DIAAP/IJP(c) JD/JG

ACC NR: AP6002030 SOURCE CODE: UR/0185/65/010/012/1365/1367

AUTHORS: Kalynovych, D. F. (Kalinovich, D. F.); Kovens'kyy, I. I. (Kovenskiy, I. I.); Smolin, M. D.

ORG: Institute of Materials Science Problems AN UkrSSR, Kiev (Instytut problem materialoznavstva AN URSR)

43
42
B

TITLE: The mobility of atoms in a molybdenum-tungsten alloy

55, 44, 27 41, 55, 71

SOURCE: Ukrayins'kyy fizychnyy zhurnal, v. 10, no. 12, 1965, 1365-1367

TOPIC TAGS: molybdenum alloy, tungsten containing alloy, physical diffusion

ABSTRACT: Radioactive isotopes of Mo^{99} and W^{185} were used to study the diffusion of the two components of an alloy of molybdenum and 35 at.% tungsten every 100C in a temperature range 1500 -- 2400C. The samples were in the form of wires 0.5 mm in diameter and about 70 mm long, the central portions of the surfaces of which were specially treated and then electrolytically covered with the radioactive isotope whose diffusion was studied. After heating of the samples with alternating current in a helium atmosphere at a certain temperature which assured a sufficiently high diffusion mobility of the investigated component, a uniform distribution of this isotope over the cross section was obtained.

Card 1/2

L 13116-66

ACC NR: AP6002030

The distribution of the radioactivity was then determined along the sample. After additional annealing at another temperature the activity distribution was measured along the sample. Two diffusion curves were thus obtained for each sample. In spite of the considerable range of temperature, the diffusion coefficients fit well the usual relation $D = D_0 \exp(-E/RT)$, with $D_0 = 6.9$ and 28 and $E = 85{,}000$ and 92,000 for W and Mo, respectively. The data indicate an increase in the activation energy of diffusion of tungsten with increasing tungsten content in the alloy. Orig. art. has: 2 tables and 3 formulas.

SUB CODE: 20/ SUB DATE: 26Dec64/ ORIG REF: 006/ OTH REF: 003

Card 2/2 HW

KALINOVICH, D.F.; KOVENSKIY, I.I.; SMOLIN, M.B.

Electrolysis in the system tungsten - molybdenum.
Elektrokhimiia 1 no.12:1488-1490 D '65. (MIRA 19:1)

1. Institut problem materialovedeniya AN UkrSSR. Submitted
March 30, 1965.

KALINOVICH, D.F. [Kalynovych, D.F.]; KOVENSKIY, I.I. [Kovens'kyi, I.I.]; SMOLIN, M.D.

Mobility of atoms in a molybdenum-tungsten alloy. Ukr.fiz.zhur. 10 no.12:1365-1367 D '65. (MIRA 19:1)

1. Institut problem materialovedeniya AN UkrSSR, Kiyev.
Submitted December 26, 1964.

ACC NR: AP6012441 SOURCE CODE: UR/0364/65/001/012/1488/1490

AUTHOR: Kalinovich, D. F.; Kovenskiy, I. I.; Smolin, M. D.

ORG: Institute of Problems of Materials Science, Academy of Sciences UkrSSR (Institut problem materialovedeniya Akademii nauk SSSR)

TITLE: Electrolysis in the tungsten-molybdenum system

SOURCE: Elektrokhimiya, v. 1, no. 12, 1965, 1488-1490

TOPIC TAGS: tungsten containing alloy, molybdenum containing alloy

ABSTRACT: An investigation was made of partial and total transport of matter in tungsten alloys containing 0.1, 15, 20, 25, 35 and 50 atm % of Mo. Specimens in the form of wire segments 0.5 mm in diameter and about 70 mm long were electroplated in their central part with a thin film of radiotracer Mo^{99} or W^{185}. The length of the deposited layer was 2-3 mm. A special homogenizing annealing of the specimens insured uniform distribution of atoms along the cross section. The starting position of the tagged zone was measured with respect to the end of the specimen. A marker was made in order to measure the total transport in the center of the specimen. Constant current was passed through specimens in an inert atmosphere. The magnitude of current was regulated by rheostats and the temperature was controlled by an optical pyrometer. After completion of the heating, the distribution of tagged atoms was again measured

UDC: 541.13

Card 1/2

ACC NR: AP6012441

along the length of the wire. On the basis of these measurements it was possible to calculate the rate of transport v^4, where the total rate of transport v consists of two components

$$v=v^4-w$$

where w is the rate of displacement of the central part. In all the investigated alloys, molybdenum migrated to the anode and tungsten to the cathode. In tungsten alloys containing 15, 20 and 25% Mo the latter is predominantly involved in transport. In the first alloy (0.1% Mo) almost all of the material transport occurs due to tungsten. In tungsten alloys containing 35 and 50% Mo at 2000°C, inversion of the sign of the overall transport takes place. Below this temperature transport of molybdenum predominates and above it the transport of tungsten becomes predominant. In the first of these two alloys, transport of both components is practically equal to 2200°C. Orig. art. has: 6 tables.

SUB CODE: 11, 07/ SUBM DATE: 30Mar65/ ORIG REF: 004/ OTH REF: 005

Card 2/2

ACC NR: AP6036901 (A) SOURCE CODE: UR/0226/66/000/011/0057/0061

AUTHOR: Kalinovich, D. F.; Kovenskiy, I. I.; Smolin, M. D.

ORG: Institute for Problems in Science of Materials, AN UkrSSR (Institut problem materialovedeniya AN UkrSSR)

TITLE: High-temperature mobility of atoms of components in a molybdenum-tungsten system

SOURCE: Poroshkovaya metallurgiya, no. 11, 1966, 57-61

TOPIC TAGS: molybdenum, tungsten, high temperature effect

ABSTRACT: An investigation was made of the diffusion of two components in eleven alloys of the molybdenum-tungsten system, containing 0.1, 15, 20, 25, 35, 50, 65, 75, 80, 85, and 99.9 at % of tungsten. The temperature range of experiments, carried out with the aid of Mo^{99} and W^{185} tracers, was 600—1000C. The values of D_o and E (in cal/mol) were calculated for all the alloys used for the investigation. Orig. art. has: 3 formulas and 3 tables. [Based on authors' abstract] [NT]

SUB CODE: 11/SUBM DATE: 03Mar66/ORIG REF: 006/OTH REF: 002/

Card 1/1

KAMENICHNYY, Iosif Solomonovich; KALINOVICH, K.I., inzh., retsenzent; RUDKOVSKIY, A.Ye., inzh., retsenzent; CHISTYAKOVA, L.G., inzh. red.; GORNOSTAYPOL'SKAYA, M.S., tekhn. red.

[Brief handbook for a heat treatment specialist] Kratkii spravochnik tekhnologa-termista. Moskva, Mashgiz, 1963. 285 p. (MIRA 16:7)

(Metals--Heat treatment)
(Metals--Handbooks, manuals, etc.)

KALINOVICH, M.L., kandidat tekhnicheskikh nauk

New vibratory drilling equipment for geological surveys. Rech. transp. 14 no.4:12-13 Ap '55. (MLRA 8:6)
(Boring machinery)

ACC NR: AR6036304 SOURCE CODE: UR/0273/66/000/009/0004/0004

AUTHOR: Merkin, D. R.; Kalinovich, M. L.

TITLE: Method of determining the frequencies of natural engine vibrations with consideration of elastic couplings

SOURCE: Ref. zh. Dvigateli vnutrennogo sgoraniya, Abs. 9.39.20

REF SOURCE: Tr. Leningr. in-ta vodn. transp., vyp. 87, 1966, 7-12

TOPIC TAGS: mechanical vibration, shock absorber, vibration, vibration analysis, natural vibration, engine vibration

ABSTRACT: A method is presented for determining frequencies of natural engine vibrations, taking the elastic connections into account. The engine is analyzed as a solid body, having six degrees of freedom, mounted on shock absorbers with vertical and horizontal elastic couplings which are designed for compression and decompression. For each vehicular engine, it is necessary to determine the range of changes in the natural frequencies for various permissible rigidity values and fastening points of elastic elements. The results of calculations have shown that

Card 1/2 UDC: 621.432-752.001.24

ACC NR: AR6036304

the parameters of shock absorbers and of elastic coupling can be selected in such a manner that the natural frequencies of the engine will be far from the resonance values. [Translation of abstract] [NT]

SUB CODE: 21/

Card 2/2

KALINOVYCH, V.M.

13.2520

29166 R
S/021/60/000/006/003/019
D210/D304

AUTHOR: Kalynovych, V.M.

TITLE: On the effect of dry friction in the axle bearings of the gyroscopic casing of a gyrostabilized compass on the nature of its motion and the precision of automatic determination

PERIODICAL: Akademiya nauk Ukrayins'koyi RSR. Dopovidi, no. 6, 1960, 735-739

TEXT: As is shown in the work of O.Yu. Ishlinskyy, (Ref. 1: ZhPMM, 20, 487 (1956)) the motion of a gyroscopic frame of a spatial gyrostabilized compass referred to a co-ordinate system xyz may be written in the form The y axis runs parallel to the total kinetic moment of both gyroscopes which together constitutes the sensitive element of the compass, and the z-axis is parallel to the axis of the gyroscopic casing,

$$\left.\begin{aligned} -\omega_z 2B\cos\sigma &= M_x, \\ \omega_x 2B\cos\sigma &= M_z, \\ \frac{d}{dt}2B\cos\sigma &= M_m, \\ -\omega_y 2B\sin\sigma &= N. \end{aligned}\right\} \quad (1)$$

Card 1/5

and the x-axis is therefore defined. In (1), $\omega_x, \omega_y, \omega_z$ are the projections upon the co-ordinate axes of the angular velocity of the gyroscopic frame referred, to a non-moving sphere S; B is the kinetic moment of each gyroscope; φ is the half-angle between the principal axes of rotation of the gyroscopes; M_x, M_y, M_z are the sums of the moments of the forces acting along the co-ordinate axes, N is the difference of the moments $M_{z'}$, $M_{z''}$ applied relative to the axles z', z'' of the gyroscopic casing along the side of the frame. Small oscillations are considered, in the case when there is dry (Coulomb) friction present in the axle bearings. The moment of friction acting on the first gyroscope is of the form: $M_{z'}^{Fr} = M_1^{Fr} \operatorname{sign} \frac{d\varphi}{dt}$ and on the second gyroscope it is

$M_{z''}^{Fr} = -M_2^{Fr} \operatorname{sign} \frac{d\varphi}{dt}$. By assuming that the xyz system of co-ordinates is defined relative to a Darb trihedral $x_0 y z_0$ by rotation through angles

Card 2/5

On the effect...

α, β, γ Fig. 1, then the equations of small oscillations are

$$\frac{d}{dt}\frac{v\alpha}{\sqrt{gR}} - \nu\beta = \omega\frac{2B\sin\varepsilon^0\delta}{mlv\sqrt{gR}},$$

$$\frac{d\beta}{dt} + \nu\frac{v\alpha}{\sqrt{gR}} = \omega\gamma,$$

$$\frac{d}{dt}\left(\frac{2B\sin\varepsilon^0}{mlv\sqrt{gR}}\cdot\delta\right) - \nu\gamma = -\omega\frac{v\alpha}{\sqrt{gR}},$$

$$\frac{d\gamma}{dt} + \frac{2B\sin\varepsilon^0}{mlR}\cdot\delta = -\omega\beta - \frac{M_1^{tp} + M_2^{tp}}{2B\sin\varepsilon^0}\operatorname{sign}\frac{d\delta}{dt}, \quad \Big] \; 2 \; (2)$$

where $\nu = \sqrt{\frac{E}{R}}$; δ is the magnitude of the deviation of ε from the value of ε^0 which is given by $2B\cos\varepsilon^0 = mlv$; and ω is the projection of the angular velocity of the Darb trihedral on z_0. See O.Yu. Ishlinskyy (Ref. 2: ZhPMM, 23, 58 /1959/) [Abstractor's note: Other symbols not explained]. Making the substitution

$$\frac{v\alpha}{\sqrt{gR}} = \tilde{\alpha}; \quad \frac{2B\sin\varepsilon^0}{mlv\sqrt{gR}}\delta = \tilde{\delta}; \quad \frac{M_1^{tp} + M_2^{tp}}{2B\sin\varepsilon^0} = M_1 \;] \; 3 \; (3)$$

Card 3/5

On the effect...

simplifying and rewriting in terms of a complex variable $z = \gamma + i\zeta$ gives a differential equation whose solution is

$$z = z_0 e^{-i\nu t} - i\frac{M}{\nu}\operatorname{sign}\frac{d\delta}{dt}. \quad (6)$$

The motion of the gyroscope along great circles of a stationary sphere is considered. The co-ordinates are φ (latitude), λ (longitude), and θ (the angle made with the x-axis). The corresponding system of differential equations is given in

$$\frac{d\varphi}{dt} = \frac{2B\cos(\varepsilon^0 + \delta_3)}{mlR}\sin\theta,$$

$$\frac{d\theta}{dt} = -\frac{2B\cos(\varepsilon^0 + \delta_3)}{mlR}\cos\theta\operatorname{tg}\varphi, \quad (8)$$

$$\frac{d\lambda}{dt} = \frac{2B\cos(\varepsilon^0 + \delta_3)}{mlR}\cdot\frac{\cos\theta}{\cos\varphi}.$$

with $\gamma = 0$, $\delta = \delta_3$.

Solving (8) and substituting the initial boundary condition $\varphi_0 = 0$, $\lambda_0 = C$, $\theta_0 = \pi/2$, gives for the automatic motion error

$$\Delta\varphi = \left[\frac{v}{R}(1 - \cos\delta_3) + \frac{2B\sin\varepsilon^0\sin\delta_3}{mlR}\right]t.$$

Card 4/5

On the effect...

Since this formula depends directly on the time t, it follows that it may be considerable increased when the time of motion is great. There are 2 figures and 3 Soviet-bloc references.

ASSOCIATION: Instytut matematiky ANURSR (Institute of Mathematics, AS UkrSSR)

PRESENTED: by O.Yu. Ishlins'kyy, Academician of the AS UkrSSR,

SUBMITTED: November 10, 1959

Fig. 1

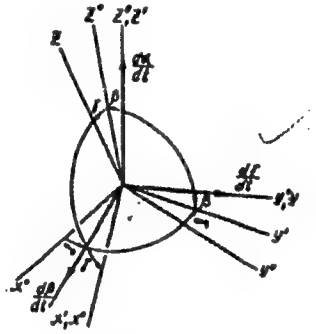


Рис. 1.

Card 5/5

On modified versions of the ...

$$\omega_x = 0, \quad \omega_y = \frac{V}{R}, \quad \omega_z = \tilde{\omega}, \qquad (2)$$

where V is the velocity of the object with respect to the fixed sphere S, and $\tilde{\omega}$ is the vertical component of the angular velocity of Darboux's trihedron (related to the trajectory of the object). V is determined according to the tracking angle σ' of the gyrocompass, by the formula $2B \cos \sigma' = mlV$. The inertial-navigation system can be modified, by replacing the elements which measure V and $\tilde{\omega}$. The following modified versions are considered: a) The directional gyroscope is replaced by an accelerometer, whose sensitivity axis is in the direction of the y-axis of the compass. Thereby $\tilde{\omega}$ is determined according to the readings of the accelerometer. b) V is determined by means of an accelerometer, whose sensitive axis is parallel to the x-axis. c) V is determined by an accelerometer, and the vertical component $\tilde{\omega}$ of the angular velocity is determined by the directional-gyroscope. d) Variant (c) is modified by replacing the gyrocompass by a two-gyroscope vertical. Formulas are derived for the errors $\Delta\omega_y$ and $\Delta\omega_z$ of the system, in the case of variant (a).

Card 2/3

S/021/62/000/005/007/009
D407/D301

On modified versions of the ...

ASSOCIATION: Instytut matematyky AN URSR (Institute of Mathematics of the AS UkrRSR)

PRESENTED: by Academician O.Yu. Ishlins'kyy of the AS UkrRSR

SUBMITTED: December 26, 1961

4

Card 3/3

24 (5), 16 (1) SOV/21-59-8-6/26

AUTHOR: Kalynovych, V. M., (Kalinovich, V. N.)

TITLE: On the Circulation of an Object on the Earth's Surface

PERIODICAL: Dopovidi Akademii nauk Ukrains'koi RSR, 1959, Nr 8, pp 837 - 841 (USSR)

ABSTRACT: The article points out that when studying the motion of an object along the Earth' surface, the fact that Earth is a complicated surface of circulation is often neglected and one thinks that motion is taking place in the plane. Thus for instance, it is assumed that when an object is moving along a circle which lies on the surface of the Earth, its direction changes proportionally to the time which again means that the northern and eastern components of the object's linear velocity change according to the rule

$$V_N = V \cos\omega t, \quad V_E = \sin\omega t \qquad (1)$$

Naturally, such an assumption will inevitably lead to errors in determining the trajectory of the object. Therefore, if an object moves a large distance and at a large

Card 1/2

On the Circulation of an Object on the Earth's Surface

radius of circulation, the convexity of the Earth is to be taken into consideration and the above formulae (1) should be made more precise. In respect to this, the author derives new formulae for the change in the northern and eastern components of the linear velocity of an object moving along a circle on the Earth's surface, the formulae $V\cos\omega t$ and $V\sin\omega t$ being their first approximations. Further, the author states that motion when taking place in conformity with the formulae $V\cos\omega t$ and $V\sin\omega t$ is not a circulation but a motion along some closed curve inscribed in a spherical zone.
There are 2 figures and 2 Soviet references.

ASSOCIATION: Institut matematiki AN USSR (Institute of Mathematics of the AS of UkrSSR)

PERIODICAL: By O. Yu. Ishlinskiy (A.Yu. Ishlinskiy), Member AS UkrSSR

SUBMITTED: February 3, 1959

S/021/60/000/006/003/019
A153/A029

13,2520

AUTHOR: Kalynovych, V.N.

TITLE: On the Effect of Dry Friction in the Axle Bearings of the Casing of Gyroscopes of a Gyrostabilized Compass on the Nature of Its Motion and the Precision of Automatic Determination

PERIODICAL: Dopovidi Akademiyi nauk Ukrayins'koyi RSR, 1960, Nr. 6, pp. 735 - 739

TEXT: Furthering the studies made by O.Yu. Ishlins'kyy (Refs. 1 - 2) the author examines the way of obtaining equations for small oscillations of a gyrostabilized compass in such cases when the coulomb (dry) friction is present in the bearings of the axles of the gyroscope's casing. The oscillations of the compass, as it moves along great circles of a stationary sphere, are studied and the problem of automatically determining errors during this form of motion is considered. The above-mentioned dry friction upon the character of oscillations in a gyroscopic horizon compass (2 and 3), and an examination of the extent of an error arising during the determination of the position of a moving object, already described by O.Yu. Ishlins'kyy (Ref. 2) are considered. The magnitude of the

Card 1/2

S/021/60/000/006/003/019
A153/A029

On the Effect of Dry Friction in the Axle Bearings of the Casing of Gyroscopes of a Gyrostabilized Compass on the Nature of Its Motion and the Precision of Automatic Determination

above error is determined by a formula which is proportional to time and, therefore, can considerably increase the error in the determination of the latitude of an object, when the time of the object's motion is great. There are 2 figures and 3 Soviet references.

ASSOCIATION: Instytut matematyky AN UkrSSR (Institute of Mathematics of the AS UkrSSR)

PRESENTED: by O.Yu. Ishlins'kyy, Academician, AS UkrSSR

SUBMITTED: November 10, 1959

Card 2/2

KALINOVICH, V.N. [Kalynovych, V.N.]

Errors of a system of autonomous determination due to free oscillations of the platform. Dop. AN URSR no.11:1438-1441 '63. (MIRA 17:12)

1. Institut matematiki AN UkrSSR.

ČERNÝ, Vladimir; HODINAROVÁ, Dagmar; KALINOVSKÁ, Milada

Experimental extermination of the tick Ixodes ricinus L. in nature with hexachlorocyclohexane. Cesk. epidem. mikrob. imun. 8 no.1:61-62 Jan 59.

1. Biologický ústav ČSAV v Praze. V. C., Praha 6, Na ovčíství 2.

(TICKS
exper. extermination of Ixodes ricinus with benzene hexachloride (Cz))
(BENZENE HEXACHLORIDE
in exper. extermination of Ixodes ricinus (Cz))

Oct 48

USSR/Physics
Ceramics
Liquid Phase

"An Experiment in Locating the Optimum Liquid Phase in Ceramic Material by the Method of Comparison," A. B. Kalinovskaya, Belorussian Polytech Inst, Minsk 2¼ pp

"Dok Ak Nauk SSSR" Vol LXII, No 6

For the liquid phase a vitreous organic substance (mixture of 95% rosin and 5% castor oil) was used. For the solid phase of a model ceramic mass, a grain of quartz sand was used. Comparison of calculated and experimental data showed close

60/49T104

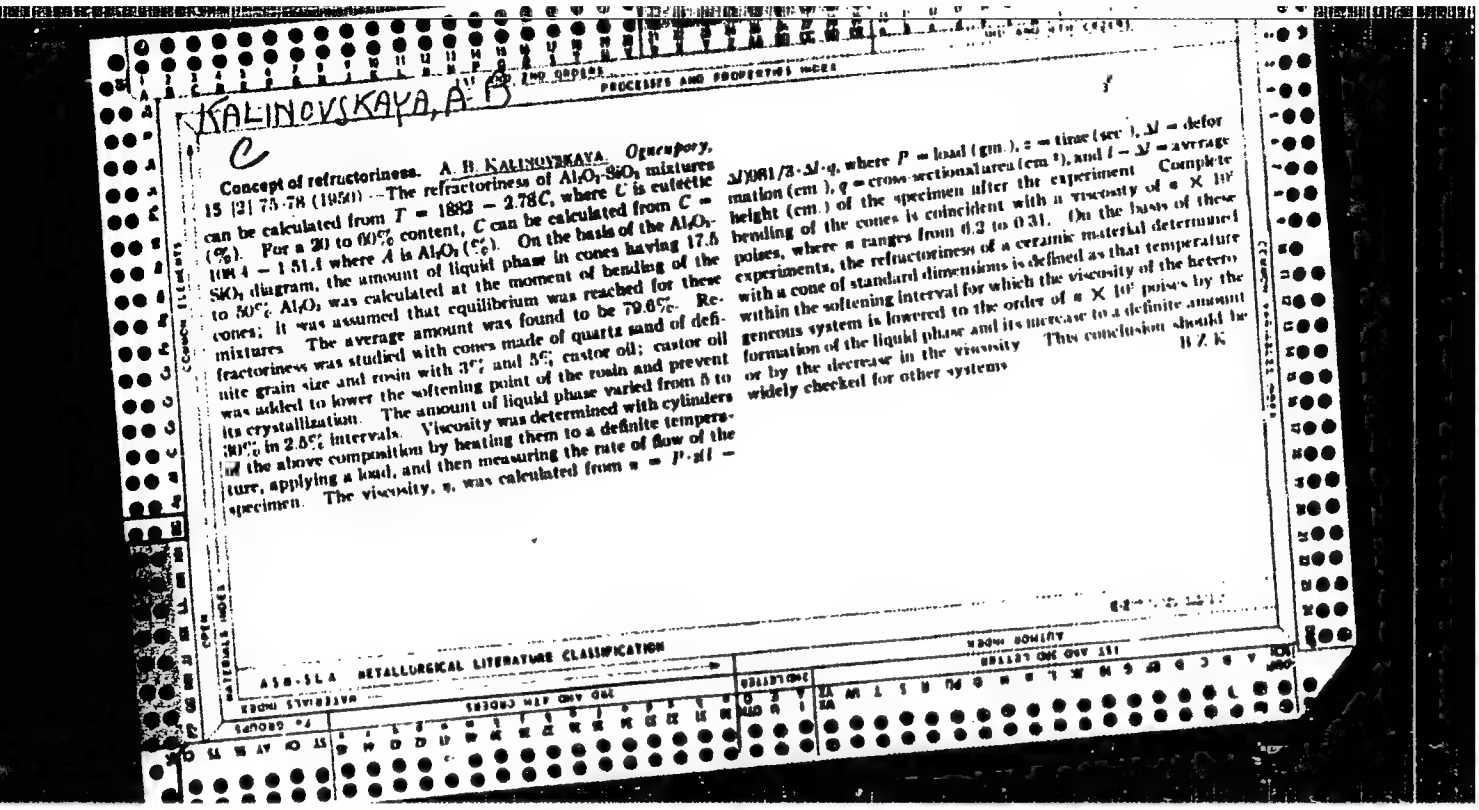
Oct 48

USSR/Physics (Contd)

resemblance. Conclusions must be checked by real ceramic masses with a silicate liquid phase. Submitted by Acad D. S. Belyankin 9 Aug 48.

60/49T104

KALINOVSKAYA, A.E



KALINOVSKAYA, A. B.

C

PROCESSES AND PROPERTIES INDEX

Concept of refractoriness. A. B. KALINOVSKAYA. *Ogneupory*, 15 [3] 75-78 (1950).—The refractoriness of Al_2O_3-SiO_2 mixtures can be calculated from $T = 1892 - 2.78C$, where C is eutectic (%). For a 20 to 60% content, C can be calculated from $C = 1084 - 1.51A$ where A is Al_2O_3 (%). On the basis of the Al_2O_3-SiO_2 diagram, the amount of liquid phase in cones having 17.5 to 50% Al_2O_3 was calculated at the moment of bending of the cones; it was assumed that equilibrium was reached for these mixtures. The average amount was found to be 79.6%. Refractoriness was studied with cones made of quartz sand of definite grain size and rosin with 3% and 5%; castor oil; castor oil was added to lower the softening point of the rosin and prevent its crystallization. The amount of liquid phase varied from 5 to 30% in 2.5% intervals. Viscosity was determined with cylinders of the above composition by heating them to a definite temperature, applying a load, and then measuring the rate of flow of the specimen. The viscosity, η, was calculated from $\eta = P \cdot \Delta t / \Delta l / 3 \cdot \Delta l \cdot q$, where P = load (gm.), t = time (sec.), Δl = deformation (cm.), q = cross-sectional area (cm^2), and $l - \Delta l$ = average height (cm.) of the cones is coincident with a viscosity of $\eta \times 10^x$ poises, where x ranges from 0.2 to 0.31. On the basis of these experiments, the refractoriness of a ceramic material determined with a cone of standard dimensions is defined as that temperature within the softening interval for which the viscosity of the heterogeneous system is lowered to the order of $\eta \times 10^x$ poises by the formation of the liquid phase and its increase to a definite amount or by the decrease in the viscosity. This conclusion should be widely checked for other systems. H Z K

A50-51A METALLURGICAL LITERATURE CLASSIFICATION

ACC NR: AT6007143 (N) SOURCE CODE: UR/3148/60/000/004/0015/0021

AUTHOR: Mishin, V. M.; Mishina, N. A.; Kalinovskaya, G. P.

ORG: None

TITLE: Analysis of latitudinal variations of the yearly trend of magnetic activity

SOURCE: AN SSSR. Mezhduvedomstvennyy geofizicheskiy komitet. III razdel programmy MGG: Geomagnetizm i zemnyye toki. Sbornik statey, no. 4, 1960, 15-21

TOPIC TAGS: ~~earth science~~, ~~magnetic storm~~, magnetic storm ~~latitude dependence~~, solar corpuscular radiation, corpuscular radiation cone, earth magnetic field, geomagnetic latitude

ABSTRACT: The paper is concerned with an analysis of latitudinal variations of the yearly trend of magnetic activity. The statistical material was gathered from Bull. no. 12, j.k. JUGG, ATME, 1959, containing tables f K-indices of the world's net of magnetic observatories, mainly for 1955-1956. A list of the stations is given. International "quiet" and "disturbed" days were grouped separately. The main regularities of the annual variations of magnetic activity were found similar to those obtained from the II IPY and IGY data. In the polar regions the average levels of activity varied several times with the transition from local summer to local winter. According to the data on the second harmonic of the annual variation of the activity, the angular width of the corpuscular radiation cone was about 90°. Orig. art. has 2 figures, 7 formulas and 1 table.

SUB CODE: 08, 03/ SUBM DATE: None/ ORIG REF: 002/ OTH REF: 001

Card 1/1

MISHIN, V.M.; KALINOVSKAYA, G.P.; MISHINA, N.A.

Yearly variations of magnetic activity according to the data of the International Geophysical Year. Geomag. i aer. 1 no.3: 387-394 My-Je '61. (MIRA 14:9)

1. Institut zemnogo magnetizma, ionosfery i rasprostraneniya radiovoln Sibirskogo otdeleniya AN SSSR.
(Magnetism, Terrestrial)

KALINOVSKAYA, I.Ya.; PROKHOROVA, E.S.

Otoneurological symptoms in arterial hypotension. Zhur. nevr. i. psikh. 63 no.6:850-852 '63. (MIRA 1.:6)

1. Institut nevrologii (direktor - prof. N.V. Konovalov) AMN SSSR, Moskva.

KALINOVSKAYA, I.Ya.; MAYORCHIK, V.Ye.

Cortical regulation of vestibular reflexes in man. Vest. otorinolar., Moskva 14 no. 3:11-16 May-June 1952. (CIML 22:4)

1. Of the Otoneurological Division (Head -- Prof. A. G. Ageyeva-Maykova) and the Laboratory of Higher Nervous Activity (Head -- Prof. L. N. Fedorov, Active Member AMS USSR), Institute of Neurosurgery (Head -- Prof. B. G. Yegorov, Active Member AMS USSR), Academy of Medical Sciences USSR, Moscow.